CLAIMS:

1. A system for post-processing of decoded digital video, comprising:

a metric calculation unit for calculation of a metric M for determining the type, aggressiveness, and order of application of a plurality of post-processing modules to the decoded digital video, the metric being based on block-based coding information obtained from the decoded digital video;

a post processing unit for improving the quality of the decoded digital video based on the metric M, comprising the plurality of post-processing modules; and

a control unit for controlling the activation of at least one post-processing module, of the plurality of post-processing modules of the post-processing unit, based on the metric M,

wherein, the quality of the decoded digital video is improved by the control unit activating, in order, at least one of the plurality of post-processing modules and the at least one activated post-processing module processing the digital video based on the metric M.

2. The system of claim 1, wherein said plurality of post-processing modules comprises at least one algorithm of each type selected from the group of types consisting of artifact reduction, sharpness enhancement, and resolution enhancement.

3. The system of claim 2, wherein the at least one artifact reduction algorithm comprises at least one of a luminance deringing algorithm based on the metric M and a chrominance deringing algorithm based on the metric M.

4. The system of claim 2, wherein the control unit further comprises a first mechanism that activates the at least one artifact reduction algorithm and turns off the at least one sharpness enhancement algorithm according to the formula:

$$M < VP\_THRED$$

and turns off the at least one artifact reduction algorithm and activates the at least one sharpness enhancement algorithm, otherwise,

wherein *VP_THRED* is a pre-determined threshold and once activated, the algorithm determines how "aggressively" the algorithm is performed based on the value of the M metric.

5. The system of claim 2, wherein the control unit further comprises a second mechanism that determines if the algorithm that was activated performed well and if so activates the algorithm that was turned off.

6. The system of claim 4, wherein the at least one artifact reduction algorithm comprises at least one of a luminance deringing algorithm based on the metric M and a chrominance deringing algorithm based on the metric M.

7. The system of claim 4, wherein the metric M calculated is a unified metric for digital video processing (UMDVP), wherein the values of the UMDVP metric are in the range of [-1,1].

8. The system of claim 7, wherein the at least one artifact reduction algorithm comprises at least one deringing algorithm based on the metric UMDVP.

9. The system of claim 8, wherein isolated zero values of UMDVP in the neighborhood of a pixel at location (i,j) having a UMDVP value of 1, are replaced by 1 to prevent performing the deringing algorithm on an isolated pixel as well as excessive blurring for the neighborhood in which the UMDVP values are a mix of 1s and 0s, wherein a neighborhood is nxn pixels surrounding the pixel being deringed.

10. The system of claim 9, wherein:

the deringing algorithm is a luminance deringing algorithm having at least one filter, the at least one filter being adapted to -

a. select a luminance filter for the pixel at location (i,j) using a 3x3 neighborhood size, according to whether the UMDVP values indicate that the 3x3 neighborhood of the pixel at location (i,j) is homogeneous and the pixel at location (i,j) has a negative UMDVP value,

b. with the selected filter, calculate a filtered value for the luminance at pixel (i,j) based on the UMDVP value at (i,j) , and

c. calculate a maximum displacement of the filtered luminance value at location (i,j) from the original luminance values at location (i,j) based at least in part on the UMDVP value at (i,j), and

d. replace the original luminance values at location (i,j) by the filtered one based on a function of the calculated maximum displacement of the filtered value from the original value.

11. The system of claim 10, wherein the filter value for the luminance at pixel(i,j) is

$$Y\_filt(i,j) = Y(i,j) - f(UMDVP(i,j)) * hp(i,j)$$

wherein, Y(i,j) is the original luminance value, f(UMDVP(i,j)) is a function of UMDVP(i,j) and hp(i,j) is a high-pass signal.

12. The system of claim 11, wherein

$$f(\mathrm{UMDVP}(i,j)) = (1-\mathrm{UMDVP}(i,j))/a$$

where "a" is selected from the sequence 2^n = 2, 4, 8, ... for n a positive integer. 13.

The system of claim 12, wherein for "a" = 4 the calculation of hp(i,j) is accomplished using the following filter kernel:

0	-1	0
-1	4	-1
0	-1	0

and the output of the filter kernel is multiplied by 0.5 to prevent very strong low-pass filtering.

14. The system of claim 10, wherein the function of the calculated maximum displacement is

a. Max_displ = PAR1 + PAR2 if pixel (i,j) belongs to homogenous area,

b. Max_displ = abs(UMDVP) * PAR1 +PAR2, if not homogenous and UMDVP(i,j) <=0,

c. Max_displ = PAR2, otherwise, wherein PAR1 and PAR2 are pre-determined parameters,

d. if the absolute difference of the original luminance value and the filtered value is greater than the calculated Max_displ, then either the original value will be kept or shifted only by the Max_displ

Y_filt(i,j) = Y

or Y_filt = Y+Max_displ

or Y_filt = Y-Max_displ.

15. The system of claim 15, wherein PAR1 =30 and PAR2 = 10.

16. The system of claim 9, wherein:

the deringing algorithm is a chrominance deringing algorithm having a filter, the filter being adapted to -

a. filter chrominance values at pixel (i,j) using a 3x5 neighborhood size, when the UMDVP values indicate that a 7x7 neighborhood of the pixel (i,j) is homogeneous,

b. calculate filtered values for the chrominance at pixel (i,j) based on low-pass filtering ,

c. calculate a maximum displacement of the filtered chrominance values at location (i,j) from the original chrominance values at location (i,j) based at least in part on the UMDVP value at (i,j), and

d. replace the original chrominance values at location (i,j) by the filtered ones based on a function of the calculated maximum displacement of the filtered values from the original values.

17. The system of claim 1, wherein said control unit serially activates said post-processing modules of the plurality of post-processing modules of the post-processing unit, based on said metric.

18 The system of claim 17, wherein said post-processing modules comprise at least at least one artifact reduction algorithm and at least one of a sharpness and resolution enhancement algorithm.

19. A method for post-processing of decoded digital video to improve the quality of the decoded digital video, comprising the steps of:

providing a mechanism that calculates a metric M for determining the type, aggressiveness, and order of application of a plurality of post-processing modules to the decoded digital video, the metric being based on block-based coding information;

providing a mechanism comprising a plurality of post-processing modules that post-process the decoded digital signal to improve the quality of the decoded digital video based on said metric;

providing a control unit for the activation of at least one post-processing module, of the plurality of post-processing modules of the post-processing unit, based on said metric,

calculating a metric M for controlling post-processing of each pixel of the block based on the metric; and

activating at least one of the plurality of provided post-processing modules whose selection and processing is based on the calculated metric M to improve the quality of the decoded digital.

20. The method of claim 19, wherein said step of providing a plurality of post-processing units comprises the step of providing at least one artifact reduction algorithm and at least one of a sharpness and resolution enhancement algorithm.

21. The method of claim 20, wherein the step of providing at least one artifact reduction algorithm further comprises the step of providing at least one luminance deringing algorithm based on the metric M and at least one chrominance deringing algorithm based on the metric M.

22. The method of claim 20, wherein the activating step further comprises the steps of:

providing a pre-determined threshold, *VP_THRED*;

if M < *VP_THRED*, performing the substeps of -

a. turning off the at least one sharpness enhancement algorithm, and

b. activating the at least one artifact reduction algorithm,

if M >= *VP_THRED*, performing the substeps of -

c. turning off the at least one artifact reduction algorithm, and

d. activating the at least one sharpness enhancement algorithm,

determining by the activated algorithm, how aggressively the algorithm is performed based on the value of the metric M.

23. The method of claim 22, wherein the step of providing at least one artifact reduction algorithm further comprises the step of providing at least one luminance deringing algorithm based on the metric M and at least one chrominance deringing algorithm based on the metric M.

24. The method of claim 23, wherein the step of calculating the metric M is further based on a mechanism that calculates M as a unified metric for digital video processing (UMDVP),

wherein, the values of the UMDVP metric are in the range of [-1,1].

25. A program product stored on a recordable medium for performing post-processing of a decoded digital video, comprising:

means for post-processing the decoded digital video based on a calculated metric;

means for calculating a metric, based on block-based coding information obtained from the decoded digital video, for determining the type, aggressiveness, and order of application of the post-processing means to the decoded digital video;

means for controlling the activation and order of activation of the post-processing means using the calculated metric.